Geographical Sciences

Department Website: http://geography.uchicago.edu

Program of Study

The discipline of geography contributes to an understanding of society by exploring the Earth’s environment and its interactions with human life, by inquiring into cultures and societies from the perspective of area study, and by investigating problems of spatial organization. The BA program in geographical sciences offers a distinctive focus for general education and provides a background both for advanced specialization in the discipline and for study in other fields. Solid grounding in modern geography can lead to careers in government service, environmental consulting, marketing, publishing, planning, and teaching at all levels.

Program Requirements

The BA degree in geographical sciences calls for the satisfactory completion of eleven courses, at least eight of which must be in geographical sciences. These include an introduction to Geographic Information Systems/GIS (GEOG 28202 Geographic Information Science I); the senior seminar (GEOG 29800 Senior Seminar); and at least nine additional geography courses, up to three of which may be in approved related fields. A BA thesis is prepared in connection with the senior seminar.

Summary of Requirements: BA in Geographical Sciences

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>GEOG 28202</td>
<td>Geographic Information Science I</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Nine additional geographical sciences</td>
<td>900</td>
</tr>
<tr>
<td>GEOG 29800</td>
<td>Senior Seminar</td>
<td>100</td>
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</tbody>
</table>

Total Units: 1100

Grading

All courses counted toward the geographical sciences major must be taken for quality grades.

Research Grants

Geographical sciences students may apply for small grants from the Ada Espenshade Wrigley Fund in support of extraordinary expenses connected with research leading to their BA thesis.

Honors

Honors are awarded to students with an overall GPA of 3.0 or higher who submit a BA thesis that is judged to be outstanding.

Awards

Each year the Committee on Geographical Sciences nominates fourth-year students for an Outstanding Senior in Geography Award from the Illinois Geographical Society and an Award for Excellence from the National Council for Geographic Education and the Association of American Geographers.

Minor in Geographic Information Science

Spatial thinking deals with the fundamental role of space, place, location, distance, and interaction—crucial to tackling many research questions in the social and physical sciences. The minor in geographic information science provides a coherent exposure to rigorous spatial thinking and its expression through the theories and methods of geographic information science. Geographic information science covers all aspects pertaining to accessing, storing, transforming, manipulating, visualizing, exploring, and reasoning about information where the locational component is important (spatial data). This includes the technical and computational aspects of geographic information systems, the methodologies of spatial analysis and spatial statistics, mapping, and geo-visualization, as well as societal aspects related to the use of geographic data. The minor serves as a complement to other majors, such as computer science, statistics, economics, public policy studies, sociology, anthropology, political science, or environmental and urban studies, but would also be of value to majors in the humanities and physical sciences interested in the spatial aspects of their field. The courses in the minor are open to geographical sciences majors, but the minor cannot be taken concurrently with a geographical sciences major.

Program Requirements for the Minor

The minor consists of six core courses and one elective from a series of offerings. The core courses provide a coherent exposure to rigorous spatial thinking and its incorporation into the methodologies of geographic information systems, spatial analysis, and spatial data science.

The electives consist of courses that touch upon various aspects of spatial thinking, with different degrees of technical materials, and are intended to either act as “gateways” into the minor or to provide the opportunity for the application of spatial analysis in a range of fields.
The sequencing of courses is designed such that students can complete all requirements for the minor in one year of study (provided the statistics prerequisite has been taken prior).

The capstone course for the minor is GEOG 28000 GIScience Practicum, which may be taken concurrently with GEOG 28602 Geographic Information Science III. Students will develop a multifaceted GIS project incorporating spatial thinking in design, infrastructure, and implementation. Projects could include the development of a web application, dynamic dashboard, interactive storytelling map, infographic-driven policy brief, or research article, and can be carried out in conjunction with a thesis requirement of the student’s major.

Summary of Requirements: Minor in Geographic Information Science

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 28202</td>
<td>Geographic Information Science I</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28402</td>
<td>Geographic Information Science II</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28602</td>
<td>Geographic Information Science III</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28000</td>
<td>GIScience Practicum</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 20500</td>
<td>Introduction to Spatial Data Science</td>
<td>100</td>
</tr>
<tr>
<td>STAT 22000</td>
<td>Statistical Methods and Applications (or equivalent)</td>
<td>100</td>
</tr>
<tr>
<td>Any elective from the list of courses below</td>
<td>100</td>
<td></td>
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<tr>
<td>Total Units</td>
<td></td>
<td>700</td>
</tr>
</tbody>
</table>

Note: many GEOG courses are also cross-listed with SOCI and ENST.

Elective Options for the Minor in Geographic Information Science

One of the following courses may be taken to fulfill the elective course option for the minor in geographic information science.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>GEOG 20273</td>
<td>Urban Spatial Archaeology I</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 24600</td>
<td>Introduction to Urban Sciences</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 24700</td>
<td>Introduction to Urban Planning</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 25900</td>
<td>Introduction to Location Analysis</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 27155</td>
<td>Urban Design with Nature</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28700</td>
<td>Readings in Spatial Analysis</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28702</td>
<td>Introduction to GIS and Spatial Analysis</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28800</td>
<td>History of Cartography</td>
<td>100</td>
</tr>
<tr>
<td>GEOG 28900</td>
<td>Readings in Urban Planning and Design</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: many GEOG courses are also cross-listed with SOCI and ENST.

Advising and Grading

Courses in the minor may not be double counted with the student's major(s), other minors, or general education requirements. For students who have taken STAT 22000 (or equivalent) as a requirement for another major, minor, or general education requirement, an approved elective must replace that requirement.

Courses in the minor must be taken for quality grades, and more than half of the requirements for the minor must be met by registering for courses bearing University of Chicago course numbers.

The courses in the minor are open to geographical sciences majors, but the minor cannot be taken concurrently with a geographical sciences major.

Students who elect the minor must meet with the program director before the end of Spring Quarter of their third year to declare their intention to complete the minor. The director’s approval for the minor program should be submitted to a student’s College adviser by the deadline above using a form available from the adviser.

Students may petition the program director to have a course counted as an elective that is not included on the current list of electives.
Geographical Sciences Courses

**GEOG 20500. Introduction to Spatial Data Science. 100 Units.**
Spatial data science consists of a collection of concepts and methods drawn from both statistics and computer science that deal with accessing, manipulating, visualizing, exploring and reasoning about geographical data. The course introduces the types of spatial data relevant in social science inquiry and reviews a range of methods to explore these data. Topics covered include formal spatial data structures, geovisualization and visual analytics, rate smoothing, spatial autocorrelation, cluster detection and spatial data mining. An important aspect of the course is to learn and apply open source software tools, including R and GeoDa.

Instructor(s): L. Anselin and M. Kolak Terms Offered: Autumn
Prerequisite(s): STAT 22000 (or equivalent), familiarity with GIS is helpful, but not necessary
Equivalent Course(s): SOCI 20253, MACS 54000, GEOG 30500, SOCI 30253

**GEOG 21900. Historical Geography of the United States. 100 Units.**
This course examines the spatial dynamics of empire, the frontier, regional development, the social character of settlement patterns, and the evolution of the cultural landscapes of America from pre-European times to 1900. All-day northern Illinois field trip required.

Instructor(s): M. Conzen Terms Offered: Autumn
Note(s): This course offered in even years.
Equivalent Course(s): GEOG 31900, HIST 28800, HIST 38800

**GEOG 22101. Changing America in the Last 100 Years. 100 Units.**
This course explores the regional organization of U.S. society and its economy during the pivotal twentieth century, emphasizing the shifting dynamics that explain the spatial distribution of people, resources, economic activity, human settlement patterns, and mobility. We put special focus on the regional restructuring of industry and services, transportation, city growth, and cultural consumption. Two-day weekend field trip to the Mississippi River required. This course is part of the College Course Cluster program: Urban Design.

Instructor(s): M. Conzen Terms Offered: Winter
Equivalent Course(s): HIST 37506, GEOG 32101, HIST 27506

**GEOG 22700. Urban Structure and Process. 100 Units.**
This course reviews competing theories of urban development, especially their ability to explain the changing nature of cities under the impact of advanced industrialism. Analysis includes a consideration of emerging metropolitan regions, the microstructure of local neighborhoods, and the limitations of the past American experience as a way of developing urban policy both in this country and elsewhere.

Instructor(s): O. McRoberts Terms Offered: Spring
Equivalent Course(s): SOCI 30104, SOCI 20104, CRES 20104, SOSC 25100, GEOG 32700

**GEOG 23003. Urban Europe, 1600-present. 100 Units.**
This course examines the growth, structure, and, on occasion, decline of European towns and cities from the seventeenth century to the present. The focus throughout is on questions directly related to the positioning, form, and function of urban communities and to the efforts of interest groups and policy makers to shape and promote the fortunes of these communities. The course is interdisciplinary in spirit and content, drawing on the contributions of historians, geographers, sociologists, economists, demographers, political scientists, urban planners, and others. There are no prerequisites; the readings and lectures cover whatever needs to be known about theories, methods, and the European context.

Instructor(s): J. Craig Terms Offered: Winter
Equivalent Course(s): HIST 23003, GEOG 33003, HIST 33003

**GEOG 23500. Urban Geography. 100 Units.**
This course examines the spatial organization and current restructuring of modern cities in light of the economic, social, cultural, and political forces that shape them. It explores the systematic interactions between social process and physical system. We cover basic concepts of urbanism and urbanization, systems of cities urban growth, migration, centralization and decentralization, land-use dynamics, physical geography, urban morphology, and planning. Field trip in Chicago region required. This course is part of the College Course Cluster, Urban Design.

Instructor(s): M. Conzen Terms Offered: Winter
Note(s): This course offered in even years.
Equivalent Course(s): GEOG 33500, ENST 24660

**GEOG 23700. Geographical Issues in Housing and Community Development. 100 Units.**
This course is part of the College Course Cluster, Urban Design.
Instructor(s): M. Conzen Terms Offered: Spring. This course offered in even years.
Prerequisite(s): Open to Chicago Studies Program students.
Equivalent Course(s): GEOG 33700, PBPL 23700

**GEOG 24100. Urban Design: The Chicago Experience. 100 Units.**
This course examines the theory and practice of urban design at the scale of block, street, and building--the pedestrian realm. Topics include walkability, the design of streets, architectural style and its effect on pedestrian experience, safety and security in relation to accessibility and social connection, concepts of urban fabric, repair and placemaking, the regulation of urban form, and the social implications of civic spaces. Students will analyze normative principles and the debates that surround them through readings and discussion, as well as firsthand interaction with the urbanism of Chicago.
Equivalent Course(s): GEOG 34100, SOCS 26001, SOCS 36001, PBPL 24105
GEOG 24190. Imagining Chicago's Common Buildings. 100 Units.
This class is an architectural studio based in the common residential buildings of Chicago and the city's built environment. While design projects and architectural skills will be the focus of the class, it will also incorporate readings, a small amount of writing, some social and geographical history, and several explorations around Chicago. The studio will: (1) give students interested in pursuing architecture or the study of cities experience with a studio class and some skills related to architectural thinking, (2) acquaint students intimately with Chicago's common residential buildings and built fabric, and (3) situate all this within a context of social thought about residential architecture, common buildings, housing, and the city. Please note: the class has required meetings on both Tuesdays (5-6:20) and Fridays (2:30-5:50, with a break) beginning on Tuesday October 2nd. This course is part of the College Course Cluster program: Urban Design.
Instructor(s): L. Joyner Terms Offered: Autumn
Note(s): Consent is required to enroll in this class. Interested students should email the instructor (Luke Joyner, lukejoy@uchicago.edu) to briefly explain their interest and any previous experience with the course topics. Please note: The course has required meetings on both Tuesdays (5-6:20 p.m.) and Fridays (2:30-5:50 p.m., with a break) beginning on Tuesday October 1. Students must attend first class to confirm enrollment.
Equivalent Course(s): ARCH 24190, ENST 24190, ARTV 20210, AMER 24190, ARTH 24190

GEOG 24300. Chicago by Design. 100 Units.
This course examines the theory and practice of urban design at the scale of block, street, and building-the pedestrian realm. Topics include walkability; the design of streets; architectural style and its effect on pedestrian experience; safety and security in relation to accessibility and social connection; concepts of urban fabric, repair, and placemaking; the regulation of urban form; and the social implications of civic spaces. Students will analyze normative principles and the debates that surround them through readings and discussion as well as firsthand interaction with the urbanism of Chicago. This course is part of the College Course Cluster, Urban Design.
Instructor(s): E. Talen Terms Offered: Spring
Equivalent Course(s): PBPL 26003, ENST 26003, SOSC 26003

GEOG 24600. Introduction to Urban Sciences. 100 Units.
This course is a grand tour of conceptual frameworks, general phenomena, emerging data and policy applications that define a growing scientific integrated understanding of cities and urbanization. It starts with a general outlook of current worldwide explosive urbanization and associated changes in social, economic and environmental indicators. It then introduces a number of historical models, from sociology, economics and geography that have been proposed to understand how cities operate. We will discuss how these and other facets of cities can be integrated as dynamical complex systems and derive their general characteristics as social networks embedded in structured physical spaces. Resulting general properties of cities will be illustrated in different geographic and historical contexts, including an understanding of urban resource flows, emergent institutions and the division of labor and knowledge as drivers of innovation and economic growth. The second part of the course will deal with issues of inequality, heterogeneity and (sustainable) growth in cities. We will explore how these features of cities present different realities and opportunities to different individuals and how these appear as spatially concentrated (dis)advantage that shape people's life courses. We will show how issues of inequality also have consequences at more macroscopic levels and derive the general features of population and economic growth for systems of cities and nations.
Instructor(s): Luis Bettencourt Terms Offered: Autumn
Prerequisite(s): STAT 22000
Equivalent Course(s): GEGO 34600, ENST 24600, PBPL 24605, SOCI 20285

GEOG 24700. Introduction to Urban Planning. 100 Units.
The academic study of urban planning encompasses a range of issues dealing with cities, from urban design to governance, economic development, local politics, and place. The goal of this course is to provide a broad overview of urban planning theory and history while at the same time introducing students to basic GIS applications for urban planners. This format provides students with a better contextual understanding of the wide range of issues currently facing 21st century cities, and at the same time serves as an introduction to the everyday practice of urban planning. The course includes readings from prominent urban theorists, a discussion of the historical development of the urban planning profession in the US, and GIS exercises that allow students to apply their theoretical urban knowledge to real-world planning problems.
Instructor(s): Kevin Credit Terms Offered: Autumn
Equivalent Course(s): ENST 24680, GEOG 34700

GEOG 25500. Biogeography. 100 Units.
This course examines factors governing the distribution and abundance of animals and plants. Topics include patterns and processes in historical biogeography, island biogeography, geographical ecology, areography, and conservation biology (e.g., design and effectiveness of nature reserves).
Instructor(s): B. Patterson (odd years, lab). L. Heaney (even years, discussion) Terms Offered: Winter
Prerequisite(s): Three quarters of a Biological Sciences Fundamentals sequence and a course in either ecology, evolution, or earth history; or consent of instructor
Equivalent Course(s): EVOL 45500, GEOG 35500, ENST 25500, BIOS 23406
GEOG 25900. Introduction to Location Analysis. 100 Units.
Understanding the location of business activities - agricultural, industrial, retail, and knowledge-based - has long been a focus for economic geographers, regional scientists, and urban planners. This course traces the key theories and conceptual models that have been developed over time to explain why economic activities tend to locate where they do. To introduce and explain these theories, this course covers several foundational concepts in economic geography and urban planning, such as: bid-rent theory, locational triangulation, various models of urban structure and growth, urban market areas, transportation, economic restructuring, and the "back-to-the-city" movement. This course incorporates several GIS exercises to teach students the basic principles of location optimization and to help illuminate the foundational theoretical principles of economic geography.
Instructor(s): K. Credit Terms Offered: Spring
Equivalent Course(s): GEOG 35900, ENST 25910

GEOG 26100. Roots of the Modern American City. 100 Units.
This course traces the economic, social, and physical development of the city in North America from pre-European times to the mid-twentieth century. We emphasize evolving regional urban systems, the changing spatial organization of people and land use in urban areas, and the developing distinctiveness of American urban landscapes. All-day Illinois field trip required. This course is part of the College Course Cluster, Urban Design.
Instructor(s): M. Conzen Terms Offered: Autumn
Note(s): This course offered in odd years.
Equivalent Course(s): GEOG 36100, HIST 38900, ENST 26100, HIST 28900

GEOG 26400. Frontiers and Borders in South Asia. 100 Units.
Sometimes the frontline of empires and nation-states, sometimes neglected or inaccessible, peripheral spaces are often of core concern to the central state. The aim of this upper-level undergraduate seminar is to examine the history of borders, borderlands, and frontiers as political and social concepts and as produced spaces. We will examine an array of case studies in addition to more theoretical scholarship that spans the disciplines of history, environmental studies, political science, anthropology, and geography. While using South Asia (itself a rather recently invented "area") as the primary geographic and historical focus this course will not be bound exclusively to it. The first goal of the course is to explore the evolution of key concepts such as space, territory, frontier, and borders/borderlands. The second goal is to develop methods for analyzing subjects that are simultaneously physical spaces and political, social, and historical ideas. Finally, it seeks to introduce students to areas that often fall beyond the penumbra of historical surveys centered on the nation-state. No prior knowledge of South Asian history is assumed. Weekly readings will average 150 pages. Note: No prior knowledge of South Asian history is assumed.
Equivalent Course(s): GLST 26804, HIST 26804, SALC 26804

GEOG 26500. Transportation Geography. 100 Units.
Transportation is one of the most important issues facing regions today, due in large part to a host of recent concerns - the "back to the city" movement, sustainability, freight traffic, autonomous vehicles - and some older ones, like suburban sprawl and aging infrastructure. This course introduces these issues in a GIScience framework by teaching students both the theory of transportation geography and empirical methods for analyzing transportation patterns in GIS. Methods covered include: network analysis, accessibility (walkability) analysis, spatial interaction models, and the economic analysis of transportation systems in GIS.
Instructor(s): K. Credit Terms Offered: Winter

GEOG 27155. Urban Design with Nature. 100 Units.
This course will use the Chicago region as a laboratory for evaluating the social, environmental, and economic effects of alternative forms of human settlement. Students will be introduced to the basics of geographic information systems (GIS) and use GIS to map Chicago’s "place types" - human habitats that vary along an urban-to-rural transect, as well as the ecosystem services provided by the types. They will then evaluate these place types using a range of social, economic and environmental criteria. In this way, students will evaluate the region’s potential to simultaneously realize economic potential, protect environmental health, and provide social connectivity. This course is part of the College Course Cluster program: Urban Design.
Instructor(s): Sabina Shaikh and Emily Talen Terms Offered: Autumn
Prerequisite(s): Third or fourth-year standing
Note(s): Students who have taken ENST 27150: Urban Design with Nature: Assessing Social and Natural Realms in the Calumet Region in the Spring of 2018 may not enroll in this course.
Equivalent Course(s): PBPL 27156, ENST 27155, BPRO 27155

GEOG 27325. Urban Ecology in the Calumet Region. 100 Units.
This course will give students a strong foundation in the local ecology of the Calumet. Students will use local research and habitats to understand fundamental concepts in ecology and the scientific method. Students will explore some of these habitats during field trips with scientists and practitioners. The course focus will be on urban ecology in the region, whether these fundamental ecological concepts are applicable, what other factors need to be considered in the urban ecosystem, and the role humans have in restoring natural and managing novel ecosystems, among other topics.
Terms Offered: TBD
Note(s): Enrollment is based on acceptance into the Calumet Quarter program. Not offered in 2019-20.
Equivalent Course(s): ENST 27325, PBPL 27325
GEOG 27600. Hist Coll: Chicago South Side. 100 Units.
No description available.
Instructor(s): K. Conzen Terms Offered: Autumn
Equivalent Course(s): HIST 29603

GEOG 27601. Colloquium: Hyde Park and Chicago's South Side as Historic Laboratory. 100 Units.
This colloquium uses Hyde Park and Chicago's South Side as a case study to introduce students to issues and methodologies in the history and historical geography of American urban life during the past century and a half. Discussions will focus on both primary and secondary source readings, and each participant will design and carry out an original research project.
Instructor(s): K. Conzen Terms Offered: Autumn
Equivalent Course(s): HIST 29613

GEOG 28000. GIScience Practicum. 100 Units.
This applied course in geographic information science builds upon and refines knowledge and geocomputational expertise gained in the GIScience sequence. Students will develop multifaceted GIS project incorporating spatial thinking in design, infrastructure, and implementation. Projects could include the development of a web application, dynamic dashboard, interactive storytelling map, infographic-driven policy brief, or research article and are encouraged to link additional disciplines like health, sociology, economics, or political science.
Instructor(s): Staff Terms Offered: Spring
Prerequisite(s): Prerequisites GIS I and GIS II
Equivalent Course(s): GEOG 38000

GEOG 28202. Geographic Information Science I. 100 Units.
This course introduces students to a wide range of geospatial technologies and techniques in order to explain the basic theory and application of geographic information systems (GIS). To do this, students will use open source or free software such as QGIS and Google Earth Pro to complete GIS lab exercises that cover a range of topics, including an introduction to different types of geospatial data, geographic measurement, GIS, principles of cartography, remote sensing, basic GIS mapping and spatial analysis techniques, remote sensing, and specific geospatial applications such as 3D modeling and geodesign. By providing a general overview of geospatial technologies, this course provides students with a broad foundational knowledge of the field of GIScience that prepares them for more specialized concepts and applications covered in future GIS courses.
Instructor(s): Kevin Credit Terms Offered: Autumn
Equivalent Course(s): GEOG 38202

GEOG 28402. Geographic Information Science II. 100 Units.
This course investigates the theory and practice of infrastructure and computational approaches in spatial analysis and GIScience. Geocomputation is introduced as a multidisciplinary systems paradigm necessary for solving complex spatial problems and facilitating new understandings. Students will learn about the elements of spatial algorithms and data structures, geospatial topologies, spatial data queries, and the basics of geodatabase architecture and design.
Instructor(s): M. Kolak Terms Offered: Winter
Prerequisite(s): Prerequisites: GIS I
Equivalent Course(s): GEOG 38402

GEOG 28602. Geographic Information Science III. 100 Units.
This advanced course extends and connects both foundational and functional GIScience concepts. Students will be introduced to advanced programming and scripting languages necessary for spatial analysis and GIScience applications. Additional topics include customization, enterprise GIS, web GIS, and advanced visualization and analytic techniques.
Instructor(s): M. Kolak Terms Offered: Spring
Prerequisite(s): Prerequisites GIS I and GIS II
Equivalent Course(s): GEOG 38602

GEOG 28700. Readings in Spatial Analysis. 100 Units.
This independent reading option is an opportunity to explore special topics in the exploration, visualization and statistical modeling of geospatial data.
Instructor(s): K. Credit and M. Kolak Terms Offered: Autumn Spring Winter. Students are required to submit the College Reading and Research Course Form. Available for either quality grades or for P/F grading.
Note(s): By permission of instructor only.
Equivalent Course(s): ENST 28800, GEOG 38700

GEOG 28702. Introduction to GIS and Spatial Analysis. 100 Units.
This course provides an introduction and overview of how spatial thinking is translated into specific methods to handle geographic information and the statistical analysis of such information. This is not a course to learn a specific GIS software program, but the goal is to learn how to think about spatial aspects of research questions, as they pertain to how the data are collected, organized and transformed, and how these spatial aspects affect statistical methods. The focus is on research questions relevant in the social sciences, which inspires the selection of the particular methods that are covered. Examples include spatial data integration (spatial join), transformations between different spatial scales (overlay), the computation of "spatial" variables (distance, buffer, shortest path), geovisualization, visual analytics, and the assessment of spatial autocorrelation (the lack of independence among spatial variables). The methods will be illustrated by means of open source software such as QGIS and R.
Instructor(s): M. Kolak Terms Offered: Spring
Equivalent Course(s): ENST 28702, GEOG 38702
GEOG 28800. History of Cartography. 100 Units.
This course offers a grand overview of the key developments in mapmaking throughout history worldwide, from pre-literate cartography to the modern interactive digital environment. It looks at the producers, their audience, the technologies and artistic systems used, and the human and global contexts in which they developed. The course also draws on the extensive map collections of Regenstein Library.
Instructor(s): Staff Terms Offered: TBD
Equivalent Course(s): GEOG 38800

GEOG 28900. Readings in Urban Planning and Design. 100 Units.
This independent reading option is an opportunity to explore contemporary debates and theoretical arguments involved in the planning and design of cities.
Instructor(s): E. Talen Terms Offered: Autumn Spring Winter. Students are required to submit the College Reading and Research Course Form. Available for either quality grades or for P/F grading.
Note(s): By permission of instructor only.
Equivalent Course(s): GEOG 38900, ENST 28980

GEOG 29100. Undergraduate Tutorial. 100 Units.
This course is intended for individual study of selected geographical problems.
Terms Offered: Autumn, Winter, Spring
Prerequisite(s): Consent of instructor.
Note(s): Available for either quality grades or for P/F grading.

GEOG 29700. Readings in Special Topics in Geography. 100 Units.
A program of supervised reading of a special topic in geography. Students will meet periodically with the instructor to discuss the readings, and submit a final paper critically reviewing the conceptual orientation and substantive content of the readings.
Instructor(s): M. Conzen, L. Anselin, E. Talen. Terms Offered: Autumn Spring Winter
Prerequisite(s): Consent of instructor.
Note(s): Consent of instructor. Students are required to submit the College Reading and Research Course Form. Available for either quality grades of for P/F grading.

GEOG 29800. Senior Seminar. 100 Units.
This course is designed for development of the BA thesis.
Instructor(s): M. Conzen Terms Offered: Winter
Prerequisite(s): Open to students with fourth-year standing who are majoring in geographical studies.
Note(s): Must be taken for a quality grade.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

- Times was used instead of Trajan.
- Times was used instead of Palatino.

The editor may contact Leepfrog for a draft with the correct fonts in place.